2.0 PROJECT DESCRIPTION

2.1 Introduction

GWF Energy LLC proposes to build and operate the Tracy Peaker Project (TPP), a nominal 169-megawatt (MW) simple-cycle power plant, on a nine-acre, fenced site within a 40-acre parcel in an unincorporated portion of San Joaquin County. The site is located immediately southwest of Tracy, California, and approximately 20 miles southwest of Stockton, California. The TPP would consist of the power plant, two onsite 115 -kilovolt (kV) switchyards, an onsite electrical transmission interconnection, an approximately 1,470-foot water supply pipeline (as measured from the fence line), an onsite natural gas supply interconnection, and improvements to an existing dirt access road approximately one mile in length. An approximately 5.2-acre area west of the plant fence line and within the 40-acre parcel would be used for construction laydown and parking. Figure 2-1 shows the regional location of the GWF site. Figure 2-2 shows the immediate site location of the GWF project, including the location of the proposed generating facility and the proposed transmission, water supply, and access routes.

The TPP would use two General Electric (GE) Model PG7121 (EA) combustion turbine generators (CTG), each with a base load nominal output of 84.4 MW at annual average conditions. The International Standards Organization temperature of 59 degrees Fahrenheit (°F) is considered representative of annual average. Each CTG would be equipped to burn only natural gas and would have an evaporative cooling system installed on the inlet air for use at higher ambient temperatures. Natural gas for the TPP would be delivered via an onsite interconnection with the existing PG&E Line 401 gas transmission pipeline.

The combustion turbines would be equipped with a dry low NO_x (DLN) combustor system to control the nitrogen oxide (NO_x) concentration exiting each CTG. The exhaust gas temperature would be reduced with ambient air to allow for additional post-combustion NO_x control with selective catalytic reduction (SCR) system. The SCR system would use aqueous ammonia to reduce the nitrogen oxides to less than 5 parts per million volume dry (ppmvd) at 15 percent oxygen (O_2). An oxidation catalyst system would also be incorporated into the emissions control system to control carbon monoxide (CO) and volatile organic compound (VOC) emissions to less than 6 ppmvd at 15 percent O_2 and less than 2 ppmvd at 15 percent O_2, respectively.

Plain View Water District (PVWD) would supply the TPP with industrial process water and nonpotable domestic water from the Delta-Mendota Canal. Drinking water for the facility would be provided by a local bottled-water vendor. The plant would be a near-zero wastewater discharge facility. Small quantities (less than 1 gallon per minute) of industrial wastewater from the plant would be stored on site and periodically transported from the plant via licensed haulers for offsite recycle or disposal.

The following sections describe the design and operation of the power plant and the associated electric transmission interconnect, natural gas supply line, and water lines. Site selection and the alternative sites considered are presented in Section 5.0 (Alternatives).

2.2 Power Plant Description, Design, and Operation

This section describes the facility's conceptual design and proposed operation.

2.2.1 Site Location, Plan, and Access

The TPP site is located in the southwest quarter of Section 36, Township 2 South, Range 4 East Mount Diablo Base Meridian on Assessor's Parcel Number 209-240-11, as shown on Figure 2-2. The parcel numbers for the water line are included in Appendix D2. The property is bounded by the Delta-Mendota Canal to the southwest, agricultural property to the south and east, and the Union Pacific Railroad to the north. Immediately north of the railroad are the Owens-Brockway glass container manufacturing plant and the Nutting-Rice warehouse. The Tracy Biomass power plant is approximately 0.6 miles to the northwest. The power plant area would be accessed via an improved 3,300-foot, asphalt-paved service road southward from W. Schulte Road to the site (refer to Figure 2-2). A listing of adjacent property owners within 500 feet of the linears and 1,000 feet of the proposed power plant is included in Appendix D2.

The detailed site layout is shown on Figure 2-3, and the plant elevation drawing is shown on Figure 2-4. These figures illustrate the location and size of the proposed power plant. Approximately nine acres of the site would be fenced to accommodate the TPP. Visual simulations with and without the proposed project are included in Section 8.11 (Visual Resources).

2.2.2 Process Description

The power plant would consist of two GE Frame 7EA CTGs equipped with a DLN combustor and associated support equipment. Each of the CTGs would generate an average of 84.4 MW. The project is expected to have an overall annual capacity factor of approximately 50 percent or more. The heat balance for power plant base load operation is shown on Figures 2-5, 2-6A, 2-6B, 2-7A, and 2-7B at 15 °F, 59 °F, and 115 °F, with the evaporative cooler on and off (except for the 15 °F case, where the evaporative cooler would not operate). The annual average heat balance is based on an ambient temperature of 59 °F, a relative humidity level of 60 percent, and an 85 percent effective evaporative cooler for the CTG combustion air.

Associated emission control equipment for each train would include a 375-horsepower (hp) blower to dilute and cool the hot CTG exhaust gases and reduce the exhaust temperature to 850 °F, and an air distribution system to maintain uniformity in the exhaust gas temperature. An SCR system and an oxidation catalyst system would be provided to reduce NO_x, CO, and VOC emissions to less than 5 ppmvd at 15 percent O_2, less than 6 ppmvd at 15 percent O_2, and less than 2 ppmvd at 15 percent O_2, respectively. A 100-foot-tall stack would be provided to release the exhaust gases into the atmosphere.

2.2.3 Power Plant Cycle

The power plant would be based on a simple (Brayton) cycle. CTG combustion air would flow through an inlet air filter and evaporative cooler and associated air inlet ductwork, would be compressed, and then would flow to the CTG combustion section. Natural gas fuel would be injected into the compressed air in the combustion section and then ignited. The hot combustion gases would expand through the turbine section of the CTG, causing it to rotate and drive the electric generator and CTG compressors.

2.2.4 Combustion Turbine Generator

The TPP would use two GE Frame 7121EA CTGs. The CTG system would consist of the following stationary CTG with supporting systems and associated auxiliary equipment:

- Inlet air filters with silencers
- Evaporative inlet air coolers
- Fuel gas scrubber
- Fuel gas heater
- Turbine/generator control system
- Lube oil cooling system
- DLN combustion system
- Compressor wash system
- Fire detection and protection system
- Generator cooling system
- Electric starting system

The CTG and accessory equipment would be contained in a metal acoustical enclosure rated at 85 decibels A scale (dBA) at 3 feet. Detailed information on noise emissions is included in Section 8.5 (Noise).

2.2.5 Major Electrical Equipment and Systems

The transmission interconnection for the TPP is discussed in Section 6.0 (Electric Transmission). 115-kV circuits would be installed from the high-voltage terminals of each generator transformer to the onsite switchyards. However, some power produced would be used on site to power auxiliaries such as pumps or control systems, and for general facility use including lighting, heating, and air conditioning. Some power would also be converted from alternating current (AC) to direct current (DC) and used as backup power for control systems and other uses. A one-line diagram that generally describes the TPP electrical system is shown on Figure 2-8.

The following subsections generally describe provisions that would be incorporated into the system's design, as represented on the one-line diagram. Specific equipment, quantities, electrical ratings, and interconnection configurations would be established during detailed design. The function of individual systems is also discussed in the following subsections. Specific electrical engineering design criteria may be found in Appendix J5 of this report.

2.2.5.1 AC Power – Transmission

Power would be generated by each CTG at 13.8 kV and then stepped up by a generator transformer to 115 kV. The 13.8-kV generator outputs would be connected by nonsegregated-phase bus duct to oil-filled, two-winding, 60-hertz (Hz) generator step-up transformers that increase the voltage to 115 kV. Surge arresters would be provided at the high-voltage bushings to protect the transformer from surges on the 115 kV system caused by lightning strikes or other system disturbances. The transformers would be installed on reinforced-concrete pads for support. Transformer oil containment provisions would be provided in the event of a leak, spill, or tank rupture. A dry-pilot deluge-type fire protection system would be provided for each step-up transformer. If necessary, firewalls would be installed between each transformer to protect it from a fire at adjacent transformers. The firewall would also offer a degree of protection to other equipment and structures in the immediate area. The high-voltage side of each step-up transformer would terminate in the 115 kV TPP switchyards using 115 kV overhead circuit conductors, 115 kV high-voltage circuit breakers, and associated disconnect switches.

2.2.5.2 AC Power – Distribution to Auxiliaries

Auxiliary power to the CTG power block would be distributed at 480 volts AC by a 480-volt balance-of-plant (BOP) low-voltage (LV) switchgear lineup. Primary power to the BOP switchgear would be supplied by two 60-Hz, two-winding unit auxiliary transformers, which would reduce the voltage at the low side of the generator step-up transformers from 13.8

kV to 480 volts. The transformers would be the outdoor oil-filled type. The 480-volt system would be high-resistance grounded to minimize the need for individual ground fault detection. The 480-volt, wye-connected, LV side of the unit auxiliary transformers would be connected to the 480-volt BOP switchgear through normally closed main breakers. A normally open tie-breaker would be supplied to allow both 480-volt switchgear buses to be supplied by one unit auxiliary transformer if the second unit auxiliary transformer is not available. The 13.8-kV, delta-connected, high-voltage (HV) side of the unit auxiliary transformers would be connected to the nonsegregated-phase bus duct between the generator breaker and the LV side of the generator step-up transformers. This connection would allow the switchgear to be powered from the auxiliary transformers with the CTGs on- or off-line. Each unit auxiliary transformer would be provided with an off-load tap changer on the HV side.

Two separate 1,000 kilovolt-ampere (kVA), two-winding, solidly grounded, 60-Hz auxiliary power transformers (APT), provided as part of the CTG manufacturer's standard equipment package, would provide power to the 4,000-volt, 800-hp cranking motor used to start the respective CTG packages. The 13.8-kV HV side of the APTs would be cable-connected to the nonsegregated-phase bus duct between the generator breaker and the LV side of the generator step-up transformer. The 4,160-volt LV side of each APT would provide power to the cranking motor through a separately mounted, fused-contactor-type, medium-voltage motor starter assembly.

Two separate 1,500 kVA, two-winding, 60-Hz APTs, provided as part of the CTG manufacturer's standard equipment package, would provide power to the equipment manufacturer's 480-volt load centers (LC). The LCs are used to supply power to loads directly associated with the CTG manufacturer's 480-volt equipment. The 13.8-kV HV supply source for this transformer is also derived by a cable connection with the 13.8-kV generator bus.

The 480-volt BOP switchgear lineup supplies power to the BOP 480-volt motor control centers (MCCs) and CTG LCs. The 480-volt BOP switchgear would have metal-enclosed breakers for each of the two main feeds, and one tie breaker. Metal-enclosed load supply breakers would also be used to supply the BOP MCCs and CTG LCs.

The BOP switchgear would provide power through feeder breakers to the 480-volt BOP MCCs and CTG LCs. The LCs and MCCs would distribute power to smaller 460-volt motors, to 480-volt power panels, and other intermediate 480-volt loads. The MCCs would distribute power to 480- to 480/277-volt isolation transformers if 277-volt, single-phase lighting loads are to be served. The 480-volt power panels would distribute power to small 480-volt loads.

Power for the AC power supply (120-volt/208-volt) system would be provided by the 480-volt MCCs an 480-volt power panels. Transformation of 480-volt power to 120/208-volt power would be provided by 480- to 120/208-volt, dry-type transformers.

2.2.5.3 DC Power Supply

The DC power supply system for BOP loads consists of one 125-volt DC battery bank, two 125-volt DC full-capacity battery chargers, metering, ground detectors, and distribution panels. A 125-volt DC system would also be supplied as part of each CTG unit. A separate 125-volt DC system would provide DC power for the substation.

Under normal operating conditions, the battery chargers supply DC power to the DC loads. The battery chargers receive 480-volt, three-phase AC power from the AC power supply (480-volt) system and continuously float-charge the battery while supplying power to the DC loads. The ground detection scheme detects grounds on the DC power supply system.

Under abnormal or emergency conditions when power from the AC power supply (480-volt) system is unavailable, the battery supplies DC power to the DC power supply system loads. Recharging of a discharged battery occurs whenever 480-volt power becomes available from the AC power supply (480-volt) system. The rate of charge is dependent on the characteristics of the battery bank, battery charger, and the connected DC load during charging. However, the anticipated maximum recharge time would be 12 hours.

The BOP 125-volt DC power supply system would be used to provide DC power to station DC loads, control power to the 480-volt secondary unit substations (SUS), MCCs, the essential service AC system, and to critical control circuits.

2.2.5.4 Essential Service AC Uninterruptible Power Supply

The essential service AC system would consist of a 120-volt AC, single-phase, 60-Hz power source to supply AC power to essential instrumentation, to critical equipment loads, and to unit protection and safety systems that require an uninterrupted power supply (UPS). The essential service AC system and the DC power supply system are both designed to ensure that all critical safety and unit protection control circuits have continuous power and can take the correct action on a unit trip or loss of plant AC power.

The essential service AC system consists of one full-capacity inverter, a solid-state transfer switch, a manual bypass switch, an alternate source transformer and voltage regulator, and AC panelboards.

The normal source of power to the system would be from the DC power supply system through the inverter to the panelboards. A solid-state static transfer switch would continuously monitor both the inverter output and the alternate AC source. The transfer switch would automatically transfer essential AC loads without interruption from the inverter output to the alternate source upon loss of the inverter output.

A manual bypass switch would also be included to enable isolation of the inverter-static transfer switch for testing and maintenance without interruption to the essential service AC loads.

2.2.5.5 Loss of AC Power

In the event of a total loss of auxiliary power, or in situations when the utility transmission system is out of service, power to emergency lighting and critical process systems would be provided by batteries and a 250-kilowatt (kW) emergency diesel generator. Refer to Section 2.2.12.8 for a description of the emergency generator. Emergency lighting would be supplied by the use of fixtures containing integral battery packs.

2.2.5.6 Black Start Power Considerations

The project would not include provisions for black start.

2.2.6 Fuel System

The CTG would be designed to burn only natural gas. Maximum natural gas requirements (heat input) during base load operation are approximately 23,772 million British thermal units per day on a higher heating value basis.

The pressure of natural gas delivered to the site via the existing pipeline (refer to Section 7.0, Natural Gas Supply) that runs through the plant site is expected to be 500 to 900 pounds per square inch gauge (psig). The minimum supply pressure would be 500 psig. The natural gas would not be pressurized. Before entering the CTG, the gas would flow through gas scrubber/filtering equipment, a gas pressure control station, a fuel gas heater (to maintain the gas temperature to 50 °F above the dew point temperature), and a flow metering station.

2.2.7 Water Supply and Use

This section describes the quantity of water required, the source of the water supply, and water treatment requirements. A water balance diagram showing the various water requirements and estimated flow rates for the facility is presented on Figures 8.14-1a and 8.14-1b in Section 8.14 (Water Resources).

2.2.7.1 Water Requirements

A breakdown of the estimated quantity of water required is presented in Tables 2-1 and 2-2. The daily water requirements shown are estimated quantities based on both turbines operating at a full load at an ambient temperature of 59 °F.

Water requirements would also depend on frequency of evaporative cooler use. The estimated water volumes in Table 2-1 are based on continuous use of the evaporative coolers.

The water requirements identified in Table 2-1 do not include the intermittent need for small quantities (3,200 gallons) of demineralized water for off-line CTG washing.

2.2.7.2 Water Supply

The TPP makeup water would be provided under a service agreement with PVWD from a turnout on the Delta-Mendota Canal located southeast of the site. A new 1,470-foot-long, 12-inch-diameter line would be constructed to transport water to the TPP fence line. This water would be used for RO makeup water, evaporative cooler makeup water, fire protection water, and nonpotable service water. A will-serve letter from PVWD, included in Appendix L, indicates that PVWD would provide up to 138 acre-feet per year (based on 100 percent Central Valley Project allocation) to the TPP. This amount is more than adequate to meet the needs of the project. For example, if the TPP were to operate as much as 8,000 hours per year, it would require approximately 30 acre-feet annually.

Potable water for drinking and domestic use would be provided by bottled water.

2.2.7.3 Water Quality

The expected water quality for the major constituents from the Delta-Mendota Canal (U. S. Bureau of Reclamation, 2001) is as follows:

• Calcium	40.7	milligrams per liter (mg/l)
• Magnesium	21.8	mg/l
• Sodium	120.0	mg/l
• Alkalinity, as calcium carbonate	129.3	mg/l
• Sulfate	120.0	mg/l
• Chloride	140.0	mg/l
• Nitrate	2.1	mg/l
• Silica	20	mg/l

2.2.7.4 Water Treatment

The TPP would include an RO system for treating the Delta-Mendota Canal water. The water treatment system would include a microfiltration system and a multistage RO system that would provide higher quality water suitable for use in the combustion turbine evaporative coolers and minimize the use of makeup water in the plant. A portable demineralization unit would provide demineralized water for CTG washing. Untreated canal water would be used for other plant uses in the service and fire water systems.

2.2.8 Waste Management

Waste management is the process whereby wastes produced at the TPP are properly handled and managed. Wastes include wastewater, solid nonhazardous waste, and hazardous waste (both liquid and solid). Waste management is discussed in more detail in Section 8.13 (Waste Management).

2.2.8.1 Wastewater Collection, Treatment, and Disposal

There are several sources of wastewater in the plant. These streams would either be reused in the process or treated and disposed of off site.

A description of process drains and stormwater management systems follows:

- **Plant Drains.** General plant drains would consist of area washdown, sample drains, unexpected equipment leakage, and drainage from facility equipment areas. Water from these areas would be collected in a system of floor drains, sumps, and piping, and routed to the oil-water separator and then to the wastewater treatment storage tank for offsite disposal by a licensed hauler. Oil would be collected and stored in a 100-gallon recycle oil tank for offsite recycling.

- **Stormwater.** Uncontaminated rainwater would be allowed to flow through a stormwater system, grading to an onsite, unlined stormwater evaporation-percolation basin.

- **Evaporative Cooler Blowdown.** Evaporative cooler blowdown would be routed to the wastewater recovery system.

- **On-Line CTG Wash.** No liquid effluent would result from the on-line washing. The CTG wash would evaporate and be emitted from the stack as water vapor.

- **Off-Line CTG Wash.** The effluent from the off-line CTG wash would be routed to the CTG water-wash drains tank (one tank for each CTG, two total).

These tanks would be periodically drained and the contents disposed off site by a licensed hauler.

The wastewater recovery system would be used to reduce the volume of wastewater produced by the plant. The system would consist of a packaged softening/filtration/reverse osmosis system. The water recovered by the wastewater treatment system would be routed to the RO product tank for use as makeup water to the evaporative coolers. The small quantity of wastewater from the final RO stage would be sent to a 10,000-gallon storage tank for offsite recycle or disposal by a licensed hauler.

2.2.8.2 Solid Wastes

Solid waste generated at the facility would include waste from the administrative and operating staff, and operations and maintenance waste. These wastes would be collected by facility operating personnel for recycling and/or disposal off site.

Waste generated by the administrative staff would include mostly paper wastes. Operations would generate wastes such as adsorbent materials, packaging, and used parts such as filter elements and 0-rings. Maintenance wastes consist of cleaning chemical containers, demolition and construction wastes, and other specialized wastes.

2.2.8.3 Hazardous Wastes

Hazardous wastes would be encountered during both the construction and operation of the TPP. Hazardous waste that may be generated or encountered during the construction phase of the project include pre-existing contaminated soils and small amounts of newly contaminated soils; small volumes of waste oil, cleaning fluids, solvents, and paints; and welding materials. During operation, types of hazardous waste that would be generated include lubricating oils, oil filters, oily rags, spent glycol, waste SCR and oxidation catalyst containing heavy metals, CTG water wash waste and other maintenance wastes (such as paints and thinners), spent sandblast media, and used batteries. The hazardous wastes would be characterized to determine the appropriate disposal method. Once properly characterized, the wastes would be temporarily stored on site, until a licensed hazardous waste hauler transports it to a recycling facility or a Class I disposal facility.

Most hazardous wastes generated on site would be recycled. These include spent SCR and oxidation catalyst and waste oils from equipment maintenance. Spent catalyst (approximately 50 cubic meters) would be returned to the manufacturer on the order of every three to eight years for metals reclamation and/or disposal. Waste oil and glycol would also be recycled.

2.2.9 Management of Hazardous Materials

Various chemicals would be stored and used during the construction and operation of the TPP. All chemicals would be stored, handled, and used in accordance with applicable laws, ordinances, regulations, and standards (LORS). Chemicals would be stored in appropriate chemical storage facilities. Bulk chemicals would be stored in storage tanks, and other chemicals would be stored in returnable delivery containers. Chemical storage and chemical feed areas would be designed to contain leaks and spills. Containment areas and drain piping design would allow a full-tank-capacity spill without overflowing the containment. For multiple tanks located within the same containment area, the capacity of the largest single tank would determine the volume of the containment area and drain piping.

Aqueous ammonia (29.5 percent by weight) would be stored in a 9,000-gallon double-walled, aboveground tank. The aqueous ammonia storage unloading area would drain to a 8,000-gallon subsurface tank, with a 10-inch-diameter drain opening to limit the surface evaporation area in the event of a leak or spill of the truck contents during unloading. The ammonia pump station would also drain to the subsurface tank.

Safety showers and eyewashes would be provided adjacent to, or in the area of, all chemical storage and use areas. Hose connections would be provided near the chemical storage and feed areas to flush spills and leaks. Plant personnel would use state-approved personal protective equipment during chemical spill containment and cleanup activities. Personnel would be properly trained in the handling of these chemicals and instructed in the procedures to follow in case of a chemical spill or accidental release. Adequate supplies of absorbent material would be stored on site for spill cleanup.

Insulating materials for electric equipment would be specified to be free of polychlorinated biphenyls (PCBs).

A list of the chemicals anticipated for use at the power plant is provided in Section 8.12 (Hazardous Materials Handling). This table identifies each chemical by type and intended use and estimates the quantity to be stored on site. Section 8.12 includes additional information on hazardous materials handling.

2.2.10 Emission Control and Monitoring

Air emissions from the combustion of natural gas in the CTG, including NO_x, VOC, and CO, would be controlled using state-of-the-art systems. To ensure that the systems perform correctly, continuous emissions monitoring (CEM) would be performed. Section 8.1 (Air Quality) includes additional information on emission control and monitoring.

2.2.10.1 NO_x Emission Control

SCR would be used to control NO_x concentrations in the exhaust gas emitted to the atmosphere to less than 5 ppmvd at 15 percent O_2. The SCR process would use aqueous ammonia. Ammonia slip, or the concentration of unreacted ammonia in the exiting exhaust gas, would be limited to less than 10 ppmvd at 15 percent O_2. The SCR equipment would include a reactor chamber, catalyst modules, ammonia storage system, ammonia vaporization and injection system, and monitoring equipment.

2.2.10.2 CO and VOC Emission Control

CO and VOC would be controlled at the CTG combustor and by an oxidation catalyst. CO would be limited to less than 6 ppmvd at 15 percent O_2, and VOC would be limited to less than 2 ppmvd at 15 percent O_2.

2.2.10.3 Particulate Emission Control

Particulate emissions would be controlled using natural gas as the sole fuel for the CTG.

2.2.10.4 Continuous Emissions Monitoring

CEM systems would sample, analyze, and record fuel gas flow rate, exhaust gas flow rate (calculated from fuel flow), NO_x and CO concentration levels, and percentage of O_2 in the exhaust gas from the stack. This system would generate emissions data, in accordance with permit requirements, and would send alarm signals to the plant control system in the control room when the level of emissions approaches or exceeds preselected limits.

2.2.11 Fire Protection

The fire protection system would be designed to protect personnel and limit property loss and plant downtime in the event of a fire. A fire alarm system consisting of a control panel annunciator and an audible alarm would activate in the event of a plant fire.

Water from the adjacent canal would be used for the fire protection system. A dedicated underground fire loop would be provided. Two fire pumps would be installed to provide adequate pressure to support the underground fire loop. Both the fire hydrants and the dedicated suppression system would be supplied from the firewater loop at a spacing that conforms with National Fire Prevention Association (NFPA) standards and county fire codes. Dedicated fire suppression systems would be installed at potential fire hazard areas, such as generator step-up transformers. Sprinkler systems would be installed in sections of the Common Services Building as required by NFPA and local code requirements.

The CTG units would be protected by a CO_2 fire protection system. Handheld fire extinguishers of the appropriate size, type, and rating would be located at code-approved intervals throughout the facility. Section 8.12 (Hazardous Materials Handling) includes additional information on fire and explosion risk, and Section 8.8 (Socioeconomics) provides information on city and county fire protection capability.

2.2.12 Plant Auxiliaries

The following systems would support, protect, and control the TPP facility.

2.2.12.1 Lighting

Lighting would be provided in the following areas:

- Building interior, office, control, and maintenance areas
- Building exterior entrances
- Outdoor equipment platforms and walkways
- Transformer areas
- Plant roads, entrance gate, and parking areas

Lighting at the proposed project site would be maintained at levels necessary to meet security, operations and maintenance, and safety requirements. Security lighting would add to the plant's overall safety. The illumination levels would be set in accordance with the latest edition of the *Illuminating Engineering Society (IES) Handbook* for power generating stations. Generally, the lighting would be from fluorescent fixtures for interior applications and high-pressure sodium fixtures for exterior applications.

Emergency lighting would be provided in accordance with the NFPA. Emergency lighting fixtures would be incandescent and powered from the normal AC power source, with automatic transfer to the emergency backup generator.

Exterior areas would use enclosed and gasketed high-pressure sodium fixtures suitable for the environment. All fixtures would be rigidly supported from a structure or from aluminum poles. All lighting would be appropriately shielded and directed inward to minimize offsite light and glare.

Lighting for outdoor locations would be controlled from local switches or photo-electric controllers. Indoor locations would be controlled from local switches.

2.2.12.2 Grounding and Lightning Protection

The electrical system is susceptible to ground faults, lightning, and switching surges, which result in unit ground potential rise. Ground potential rise constitutes a hazard to site personnel and electrical equipment. The station grounding system would provide an adequate path for the dissipation of ground fault currents and minimize the ground potential rise.

The station grounding grid would be designed with adequate capacity to dissipate heat from ground current under the most severe fault conditions in the areas of high ground fault current concentration. The grid spacing would be such that safe voltage gradients are maintained.

Bare conductors would be installed below grade in a grid pattern. Each junction of the grid would be bonded together by either an exothermal welding process or mechanical connectors.

Ground resistivity readings, performed as part of the subsurface investigations, would be used to determine the necessary numbers of ground rods and grid spacing to ensure safe step and touch potentials under fault conditions.

Grounding cables would be brought from the ground grid to connect to building steel, tanks, equipment, fences, and nonenergized metallic parts of electrical equipment. The grounding system would be extended, by way of stingers and conductors installed in cable trays, to the remaining plant equipment that requires grounding. Insulated grounding conductors installed and connected to the ground grid would be provided for sensitive control systems. Lightning protection would be furnished for buildings and structures in accordance with NFPA 780 or Underwriters Laboratories, Inc. (UL) 96 and 96A. Lightning protection requirements unique to the switchyards are addressed as part of the electric transmission system in Section 6.0 (Electric Transmission).

2.2.12.3 Control System

All CTG controls and monitoring would be performed in the control system furnished by the manufacturer of the CTG. Selected BOP control would also be performed in the manufacturer's control system.

The control system would provide modulating control, digital control, monitoring, and indicating functions for the respective plant power block systems. In general, the system would be capable of the following functions:

- Controlling the CTGs and supporting systems in a coordinated manner
- Controlling selected BOP systems
- Monitoring controlled plant equipment and process parameters and delivering this information to plant operators
- Providing control displays (printed logs, cathode ray tubes [CRT]) for signals generated within the system or received from input/output (I/O)
- Providing consolidated plant process status information through displays presented in a timely and meaningful manner
- Providing alarms for out-of-limit parameters or parameter trends, displaying on alarm CRT(s), and recording on an alarm log printer
- Providing storage and retrieval of historical data

The exact control and monitoring functions may vary pending detailed design definition. The gas turbine control system is a state-of-the-art, triple-modular-redundant microprocessor control system. A key feature is its three separate but identical controllers. All critical control algorithms, protective functions, and sequencing are performed by these processors. The main components and features of the CTG manufacturer's system are as follows:

- CRT-based operator consoles (local and remote)
- Skid-mounted control panel
- Various CTG control and alarm functions
- Auto/manual synchronizing module with sync check function
- Control processing units
- Analog and digital I/O and associated cabinets
- Historical data unit

- Printers

A more detailed description of the construction and operational features of the CTG control system may be found in the manufacturer’s proposal.

The CTG control system would have the flexibility to interface with an external distributed control system (DCS) or programmable logic controller (PLC) supplied as part of the BOP system. The system would be designed with sufficient redundancy to prevent a single device failure from significantly impacting overall plant control and operation. Critical control and safety systems would also have redundancy, as well as an uninterruptible power source.

Additional control and instrumentation design criteria may be found in Appendix J4 of this report.

2.2.12.4 Cathodic Protection

The cathodic protection system would be designed in accordance with the mechanical engineering design criteria (Appendix J3) to control the electrochemical corrosion of designated metal piping buried in the soil. Depending upon the corrosion potential and the site soils, either passive or impressed current cathodic protection would be provided.

2.2.12.5 Freeze Protection

If required to sustain the efficient operation of individual power plant systems and equipment during operation below ambient temperature limits, a freeze protection system would provide electrical heating to prevent various outdoor piping, gauges, pressure switches, and other devices from freezing. All freeze protection circuits would be controlled with an ambient thermostat. The heating circuits would be de-energized when freezing conditions no longer exist. Requirements for freeze protection equipment on individual systems or equipment would be determined during the detail design in consideration of ambient temperature variations at the site.

2.2.12.6 Service Air

The service air system would supply compressed air to hose connections for general plant use. Service air headers would be routed to hose connections located at various points throughout the facility.

2.2.12.7 Instrument Air

The instrument air system would provide clean and dry air to pneumatic operators and devices. An instrument air header would be routed to locations within the facility equipment and water treatment areas where pneumatic operators and devices would be located.

2.2.12.8 Emergency Generator

Supplementary to the DC battery system, a diesel-fueled emergency generator system would provide long-term power for a safe and orderly shutdown of each generating unit following the loss of AC auxiliary power and would provide for long-term essential loads. The emergency generator would be ready to start automatically upon loss of power. The emergency diesel generator skid would store 150 gallons of low sulfur (<0.05 percent by weight) diesel. The emergency generator would consist of a three-phase, 60-Hz generator driven by a direct-coupled engine. The rating of the engine generator would be about 250 kW, with the actual rating determined during detail design. The generator would be wye-connected with a solidly grounded neutral.

The emergency generator system would consist of the following:

- Emergency generator
- Automatic start, circuit breaker closing, and loading capability
- Synchronizing capability for exercising the unit during normal plant operating conditions
- Metering and protection functions
- Self-contained air or DC battery starting capability
- Self-contained 150-gallon fuel tank

The generator would normally be reliability tested for 15 minutes once per week to ensure operability.

2.2.13 Interconnect to Electrical Grid

The CTGs would be connected to individual, dedicated, three-phase step-up transformers that would be connected to the TPP 115 kV onsite switchyards. From the switchyards, the generated power would connect onsite with PG&E's 115 kV Tesla-Kasson transmission line. A complete description of the transmission interconnect is contained in Section 6.0 (Electric Transmission).

2.2.14 Project Construction

Construction of the generating facility is anticipated to commence in November 2001 and proceed for approximately eight months. Major milestones are listed in Table 2-3.

There would be an average and peak onsite workforce of approximately 95 and 178, respectively, of craft laborers and supervisory, support, and construction management personnel during construction (Table 8.8-10). It is anticipated that the peak workforce would be needed from the third month through the seventh month of the construction period, and that an adequate supply of skilled labor by craft would be available for the construction of the project (see Section 8.8, Socioeconomics).

Construction laydown and parking areas would be located west of the TPP plant site on 5.2 acres of the 40-acre parcel. Additional laydown area is available on the northeastern portion of the 40-acre parcel if necessary. An improved 3,300-foot, asphalt-paved road from W. Schulte Road would provide access to the site. There would be a new at-grade crossing for the Union Pacific Railroad, as shown on Figure 2-2. Materials and equipment would be delivered by both rail and truck. Rail deliveries would use the existing rail corridor bordering the site. Construction would typically take place between the hours of 6 a.m. and 6 p.m., Monday through Saturday. Additional hours may be necessary to make up schedule deficiencies or to complete critical construction activities. During the startup phase of the project, some activities may continue 24 hours a day, seven days a week.

Table 2-4 provides an estimate of the amount of average and peak construction traffic during the eight-month construction period. Section 8.10.3.2 (Construction Phase – Traffic Impacts) includes additional information on the estimate.

The project is scheduled for commercial operation in July 2002. The applicant believes this schedule is reasonable based upon the experience of the selected engineering procurement and construction contractor, Black & Veatch, in the construction of similar simple-cycle projects.

2.2.15 Power Plant Operation

The TPP would be operated by operations and maintenance employees from other existing GWF facilities in the area. Operations and maintenance personnel would be dispatched to operate the plant when it is scheduled to operate by the California Department of Water Resources (CDWR). GWF has signed a contract with the CDWR that provides for the purchase of up to 4,000 hours per year of plant generating capacity. GWF wishes to retain the flexibility to operate the plant for sale of electricity beyond the contracted hours, contingent upon demand requirements of the Independent System Operator–managed transmission distribution system. The facility would be capable of operation seven days a week, 24 hours a day.

The project is expected to have an overall annual capacity factor of approximately 50 percent or more. However, the exact operational profile of the plant cannot be defined, because the facility would be operated to satisfy the demands of the system.

Only the capacity that would be sold through the CDWR contract can be accurately predicted. The contract allows CDWR to purchase up to 4,000 hours per year of the TPP's full generating capacity. It is anticipated that these hours of operation would normally occur during the periods of peak power demand. Operation outside of the contract would be a function of the prices offered for spot purchases, and the exact extent of TPP operation beyond 4,000 hours per year cannot be determined. It is anticipated that any one CTG would either be operated at 100 percent load or would be shut down. Therefore, possible modes of operation include: both CTGs at 100 percent load, one CTG at 100 percent load, or full shutdown. To ensure that other possible operating conditions are evaluated, performance at 60 percent load has also been considered.

Security of the facilities would be maintained on a 24-hour basis. In the unlikely event that a contingency plan for the temporary cessation of operations must be implemented, such a contingency plan will conform with applicable laws, ordinances, regulations, and standards (LORS) for the protection of public health, safety, and the environment. Depending on the expected duration of shutdown, the plan may include the draining of chemicals from storage tanks and other equipment and the safe shutdown of equipment. All wastes would be disposed of according to applicable LORS. If the cessation of operations becomes permanent, decommissioning would be undertaken (refer to Section 4.0, Facility Closure).

2.3 Facility Safety Design

The TPP would be designed to maximize safe operation. Hazards that could affect the facility include earthquake, flood, and fire. Facility operators would be trained in safe operation, maintenance, and emergency response procedures to minimize the risk of personal injury and damage to the plant.

2.3.1 Natural Hazards

The principal natural hazards associated with the TPP site are earthquakes, floods, and lightning strikes. The site is located in Seismic Risk Zone 4. Structures would be designed to meet the seismic requirements of California Code of Regulations (CCR) Title 24 and the 1998 California Building Code (CBC). Section 8.15 (Geologic Resources and Hazards) discusses the geological hazards of the area and site. This section includes a review of potential geologic hazards, seismic ground motions, and the potential for soil liquefaction due to ground shaking. Appendix J2 includes the structural seismic design criteria for the buildings and equipment.

The site is essentially flat, with an average elevation of 176 feet above mean sea level (MSL). According to the Federal Emergency Management Agency (FEMA), the site is not within either the 100- or 500-year floodplain. Section 8.14 (Water Resources) includes additional information on the potential for flooding.

2.3.2 Emergency Systems and Safety Precautions

This section discusses the fire protection systems, emergency medical services, and safety precautions to be used by project personnel. Section 8.8 (Socioeconomics) includes additional information on area medical services, and Section 8.7 (Worker Health and Safety) includes additional information on safety for workers. Compliance with these requirements would minimize project effects on public and employee safety.

2.3.2.1 Fire Protection Systems

The project would rely on both onsite fire protection systems and local fire protection services.

Onsite Fire Protection Systems. The fire protection systems would be designed to protect personnel and limit property loss and plant downtime in the event of a fire or explosion. The project would have the following fire protection systems:

- **Fire Protection System.** This system would protect the gas turbine, generator, and accessory equipment compartments from fire. The system would have fire detection sensors in all compartments. Actuating one sensor would trigger a high-temperature alarm on the combustion turbine control panel. Actuating a second sensor would trip the combustion turbine, turn off ventilation, close ventilation openings, and automatically discharge CO_2 at a design concentration adequate to extinguish the fire.

- **Transformer Deluge Spray System.** This system would provide fire suppression for the generator transformers in the event of a fire. The deluge systems would be fed by the plant underground fire water system.

- **Fire Hydrants/Hose Stations.** This system would supplement the plant fire protection system. Water would be supplied from the plant underground fire water system.

- **Fire Extinguisher.** The plant administrative building and other buildings would be equipped with portable fire extinguishers as required by the local fire department.

Local Fire Protection Services. In the event of a major fire, plant personnel would be able to call upon the City of Tracy Fire Department for assistance. The closest fire stations are located at 16502 W. Schulte Road (Station No. 94) and at 595 W. Central Avenue

(Station No. 97), both of which can respond within five minutes. The Hazardous Materials Risk Management Plan (see Section 8.12, Hazardous Materials Handling) for the plant would include the information necessary to permit firefighting and other emergency response agencies to plan and implement safe responses to fires, spills, and other emergencies.

2.3.2.2 Personnel Safety Program

The TPP would operate in compliance with federal and state occupational safety and health program requirements. Compliance with these programs would minimize project effects on employee safety. These programs are described in Section 8.7 (Worker Health and Safety).

2.4 Facility Reliability

This section discusses the expected plant availability, equipment redundancy, fuel availability, water availability, and project quality control.

2.4.1 Plant Availability

Because of the TPP's predicted high efficiency, it is anticipated that the facility would normally be called on to operate at high average annual capacity factors. The facility would be designed to operate at base load. Neither CTG is intended to operate at partial load, except during startup and shutdown.

The TPP would be designed for an operating life of 30 years. Reliability and availability projections are based on this operating life. However, it is conceivable that the TPP could operate for a longer period. Operation and maintenance (O&M) procedures would be consistent with standard industry practices to maintain the useful life of plant components.

2.4.2 Redundancy of Critical Components

The following sections identify equipment redundancy as it applies to project availability. Equipment redundancy is summarized in Table 2-5.

2.4.2.1 Power Block

The combustion turbine power generation train would be powered by two natural-gas-fired combustion turbines. The combustion turbines would provide 100 percent of the total simple-cycle power block output. The simple-cycle power block comprises the major components described below.

CTG Subsystems. The combustion turbine subsystems would include the combustion turbine, inlet air filtration and evaporative cooling system, generator and excitation systems, and turbine control and instrumentation. The combustion turbine would produce thermal energy through the combustion of natural gas; the thermal energy would be converted into mechanical energy through rotation of the combustion turbine, which drives the compressor and generator.

2.4.2.2 Control System

The gas-turbine control system as provided by the CTG system manufacturer is a triple-modular-redundant, microprocessor-based control system. A key feature is its three separate but identical controllers. All critical control algorithms, protective functions, and sequencing are performed by these processors, which provide the data needed to generate outputs to the turbine. Protective outputs are routed through the protective module, which consists of triple-redundant processors that also provide independent protection for critical functions such as over-speed.

The three control processors acquire data from triple-redundant sensors as well as from dual or single sensors. All critical sensors for continuous controls, and for protection, are triple redundant. Other sensors are dual or single devices fanned out to all three control processors. The extremely high reliability achieved by the triple-modular-redundant control systems is due, in considerable measure, to the use of triple sensors for all critical parameters.

The control system has extensive built-in diagnostics and includes “power-up,” background, and manually initiated diagnostic routines capable of identifying both control panel, sensor, and output device faults. These faults are identified down to the board level for the panel, and to the circuit level for the sensor or actuator component. On-line replacement of boards is made possible by the triple-redundant design and is also available for those sensors where physical access and system isolation are feasible.

2.4.2.3 Demineralized Water System

A portable demineralization system would supply the small quantity of water needed for CTG wash water. This water would be stored in a 2,000-gallon CTG water wash tank. The system would be regenerated off site under a service contract.

2.4.2.4 Compressed Air System

The compressed air system comprises the instrument air and service air subsystems. The service air system supplies compressed air to the instrument air dryers and to hose connections for general plant use. The service air system would include two 100-percent-capacity air compressors, service air headers, distribution piping, and hose connections. The instrument air system supplies dry compressed air at the required pressure and capacity for all control air demands, including pneumatic controls, transmitters, instruments, and valve operators. The instrument air system would include two 100-percent-capacity air dryers with prefilters and afterfilters, an air receiver, instrument air headers, and distribution piping.

2.4.3 Fuel Availability

Fuel would be delivered by the existing PG&E Line 401 gas pipeline, which passes through the proposed TPP site. Capacity in the pipeline is sufficient to supply the proposed TPP. It is conceivable that the existing gas pipeline to the TPP could become temporarily interrupted. Because the TPP has no backup supply of natural gas, the facility would be shut down until the situation was corrected and gas service restored.

2.4.4 Water Availability

The primary source of water for the evaporative cooler and for other miscellaneous uses would be from the Delta-Mendota Canal adjacent to the proposed TPP plant. Water for drinking purposes would be delivered in bottles. The availability of water to meet the needs of the TPP is discussed in more detail in Section 8.14 (Water Resources). A will serve letter for the project has been provided by PVWD (see Appendix L).

2.4.5 Project Quality Control

The objective of the TPP Quality Control Program would be to ensure that all systems and components have the appropriate quality measures applied during design, procurement, manufacturing, construction, and operation. The goal of the Quality Control Program is to achieve the desired levels of safety, reliability, availability, operability, constructability, and maintainability for the generation of electricity.

Quality assurance for a system is obtained by applying appropriate controls to various activities. For example, the appropriate controls for design work are checking and review, and the appropriate controls for manufacturing and construction are inspection and testing. Appropriate controls would be applied to each of the various project activities.

2.4.5.1 Project Stages

For quality assurance planning purposes, project activities have been divided into the following nine stages:

- **Conceptual Design Criteria.** Activities such as the definition of requirements and engineering analyses.
- **Detailed Design.** Activities such as the preparation of calculations, drawings, and lists to describe, illustrate, or define systems, structures, or components.
- **Procurement Specification Preparation.** Activities necessary to compile and document the contractual, technical, and quality provisions for procurement specifications for plant systems, components, or services.
- **Manufacturer Control and Surveillance.** Activities necessary to ensure that manufacturers conform to the provisions of procurement specifications.
- **Manufacturer Data Review.** Activities required to review manufacturers' drawings, data, instructions, procedures, plans, and other documents to ensure coordination of plant systems and components and conformance to procurement specifications.

- **Receipt Inspection.** Inspection and review of products upon delivery to the construction site.
- **Construction/Installation.** Inspection and review of storage, installation, and cleaning and initial testing of systems or components at the plant site.
- **System/Component Testing.** Actual controlled operation of power plant components in a system to ensure that the performance of systems and components conforms to specified requirements.
- **Plant Operation.** Actual operation of the power plant system.

As the project progresses, the design, procurement, manufacturing, erection, and checkout of each power plant system would progress through these nine stages defined above.

2.4.5.2 Quality Control Records

The following quality control records would be maintained for review and reference:

- Project instructions manual
- Design calculations
- Project design manual
- Quality assurance audit reports
- Conformance to construction records drawings
- Procurement specifications (contract issue and change orders)
- Purchase orders and change orders
- Project correspondence

For procured component purchase orders, a list of qualified suppliers and subcontractors would be developed. Before contracts are awarded, the subcontractors' capabilities would be evaluated. The evaluation would include consideration of suppliers' and subcontractors' personnel, production capability, past performance, and quality assurance program.

During construction, field activities would be accomplished during the last four stages of the project: receipt inspection, construction/installation, system/component testing, and plant operation. The construction contractor would be contractually responsible for performing the work in accordance with the quality requirements specified by the contract.

The subcontractors' quality compliance would be surveyed through inspections, audits, and the administration of independent testing contracts.

To control quality, GWF would implement a plant O&M program typical for a project of this size. A specific O&M program for this project would be defined and implemented during initial plant startup.

2.5 Facility Design Laws, Ordinances, Regulations, and Standards

2.5.1 Overview

Table 2-6 provides an overview of facility design LORS. See Appendix J for a more detailed presentation. The TPP would be constructed in accordance with all applicable LORS. Table 2-6 indicates specific facility design LORS, which agencies enforce them, and where conformance with the individual LORS is discussed. Proposed conditions of certification are contained in Appendix K. These conditions are proposed in order to ensure compliance with applicable LORS and/or to reduce potentially significant impacts to less-than-significant levels.

2.5.2 Facility Design

The following fundamental engineering fields are analyzed and discussed, where indicated, for LORS compliance.

2.5.2.1 Civil and Structural Engineering

The design of structures and facilities would be based on the codes, specifications, industry standards, and regulations, and other reference documents in effect at the time of design. Applicable codes and industry standards with respect to the project's engineering design criteria, construction, and operation are summarized in Appendix J1, Foundations and Civil Engineering Design Criteria, and Appendix J2, Structural and Seismic Engineering Design Criteria.

2.5.2.2 Mechanical Engineering

The design of structures and facilities would be based on the codes, specifications, industry standards, and regulations, and other reference documents in effect at the time of design. Applicable codes and industry standards with respect to the project's engineering design criteria, construction, and operation are summarized in Appendix J3, Mechanical Engineering Design Criteria. Applicable sections of system control design criteria, as summarized in Appendix J4, Control Systems Engineering Design Criteria, would also be considered.

2.5.2.3 Electrical Engineering

The design of structures and facilities would be based on the codes, specifications, industry standards, and regulations, and other reference documents in effect at the time of design. Applicable codes and industry standards with respect to the project's engineering design criteria, construction, and operation are summarized in Appendix J5, Electrical Engineering Design Criteria. Applicable sections of system control design criteria, as summarized in Appendix J4, Control Systems Engineering Design Criteria, would also be considered.

2.5.3 Typical Codes and Standards for Construction and Design

The following are typical codes and standards for general plant construction and design; additional codes and standards may be used, depending on the final plant design and equipment selection.

Air Conditioning and Refrigeration Institute (ARI)

- ARI 430-1989--Central Station Air Handling Units

Air Movement and Control Association (AMCA)

- AMCA-210 - 1985--Laboratory Methods of Testing Fans for Rotating
- AMCA-500 - 1989--Test Methods for Louvers, Dampers and Shutters

American Petroleum Institute (API)

- API 599--Steel and Ductile Iron Plug Valves

- API 608--Metal Ball Valves - Flanged and Butt-Welding Ends
- API 609--Lug and Wafer-Type Butterfly Valves
- API 610--Centrifugal Pumps for Petroleum, Heavy-Duty Chemical and Gas Industry Services

American Society of Civil Engineers (ASCE)

- ASCE 7--Minimum Design Loads for Buildings and Other Structures

American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE)

- Handbook: Fundamentals - 1997
- Handbook: HVAC Applications - 1995
- Handbook: HVAC Systems and Equipment - 1996
- Handbook: Refrigeration - 1998
- Standard: 15-1994--Safety Code for Mechanical Refrigeration
- Standard: 52-1976--Method of Testing Air Cleaning Devices Used in General Ventilation for Removing Particulate Matter
- Standard: 62-1989--Ventilation for Acceptable Indoor Air Quality
- Standard: 90.1-1989--Energy Efficient Design of Buildings

American Welding Society (AWS)

- Welding procedures and qualifications for welders would follow the recommended practices and codes of the AWS
  - AWS D1.4--Structural Welding Code - Reinforcing Steel

American Water Works Association (AWWA)

- AWWA Cl10--Ductile Iron and Gray Iron Fittings, 3 inches through 48 inches for Water and Other Liquids
- AWWA ClII--Rubber-Gasket Joints for Ductile-Iron and Grey Iron Pressure Pipe and Fittings

- AWWA C301--Prestressed Concrete Pressure Pipe, Steel-Cylinder Type For Water and Other Liquids
- AWWA C304--Design of Prestressed Concrete Cylinder Pipe
- AWWA C502 Dry-Barrel Fire Hydrant
- AWWA C906--Polyethylene Pressure Pipe and Fittings, 4 inches through 63 inches for Water Distribution
- AWWA D100--Welded Steel Tanks for Water Storage
- AWWA Ml 1--Water Supply Practices, Pipe - Design and Installation

California Energy Commission

- Recommended Seismic Design Criteria for Non-Nuclear Generating Facilities in California

California Occupational Health and Safety Administration (OSHA and CAL-OSHA)

- Design and construction would conform to federal and California Occupational Safety and Health Administration (OSHA and CAL-OSHA) requirements

Chartered Institute of Building Services Engineers (CIBSE)

- Guide-A

Crane Technical Paper

- 410--Flow of Fluids Through Valves, Fittings, and Pipe
- **Concrete Reinforcing Steel Institute (CRSI)**
- Manual of Standard Practice
- Structural concrete and reinforcing steel would be designed and placed in accordance with the codes, guides, and standards of the American Concrete Institute (ACI) and the CRSI.

Factory Mutual (FM)

- Roof covering design would comply with the requirements of the FM

Federal

- Title 29, Code of Federal Regulations (CFR), Part 1910, Occupational Safety and Health Standards
- Title 29, CFR, Part 1926, National Safety and Health Regulations for Construction
- Walsh-Healy Public Contracts Act (Public Law 50-204.10)

General Electric Standards

- Station Designers Handbook
  - GEK 27060B--Design Recommendations for Steam Piping Systems Connected to Steam Turbine Generators

Heat Exchange Institute (HEI)

- Standard for Power Plant Heat Exchangers
- TEMA (Tubular Exchanger Manufacturers Association)

Hydraulic Institute (HI)

- Standards for Centrifugal, Rotary & Reciprocating Pumps

International Society for Measurement & Control

- ISA S7.3--Quality Standard for Instrument Air

Metal Building Manufactures Association (MBMA)

- Low-Rise Building Systems Manual

National Environmental Balancing Bureau (NEBB)

- Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems - 1992

National Fire Protection Association (NFPA)

- Roof covering design would comply with the requirements of the NFPA

- NFPA 10--Portable Fire Extinguishers
- NFPA 12--Carbon Dioxide Extinguishing Systems
- NFPA 13--Installation of Sprinkler Systems
- NFPA 14--Installation of Standpipe and Hose Systems
- NFPA 15--Water Spray Fixed Systems for Fire Protection
- NFPA 22--Standard for Water Tanks for Private Fire Protection
- NFPA 24--Private Fire Service Mains and Their Appurtenances
- NFPA 30--Flammable and Combustible Liquids Code
- NFPA 70--National Electric Code
- NFPA 72--Protective Signaling Systems
- NFPA 80 --Standard for Fire Doors and Fire Windows
- NFPA 85--Fire Protection for Electric Generating Plants
- NFPA 850--Recommended Practice for Fire Protection for Electric Generating Plants
- NFPA 90A--Installation of Air Conditioning and Ventilating Systems
- NFPA 90B--Installation of Warm Air Heating and Air Conditioning Systems

Sheet Metal and Air Conditioning Contractors' National Association (SMACNA)

- HVAC Duct Construction Standards, Metal and Flexible, First Edition - 1985

State

- Business and Professions Code Section 6704, et seq.; Sections 6730 and 6736. Requires state registration to practice as a Civil Engineer or Structural Engineer in California.
- Labor Code Section 6500, et seq. Requires a permit for construction of trenches or excavations 5 feet or deeper into which personnel have to descend.

This also applies to construction or demolition of any building, structure, false work, or scaffolding that is more than three stories high or equivalent.

- Title 24, California Code of Regulations (CCR) Section 2-111, et seq.; Section 3-100, et seq.; Section 4-106, et seq.; Section 5-102, et seq.; Section 6-T8-769, et seq.; Section 6-T8-3233, et seq.; Section 6-T8-3270, et seq.; Section 6-T8-5138, et seq.; Section 6-T8-5465, et seq.; Section 6-T8-5531, et seq.; and Section 6-T8-5545, et seq. Adopts current edition of the California Building Code as minimum legal building standards.

- Title 8, CCR Section 1500, et seq.; Section 2300, et seq.; and Section 3200, et seq. Describes general construction safety orders, industrial safety orders, and work safety requirements and procedures.

- Regulations of the following state agencies, as applicable:

  - Department of Labor and Industry Regulations

  - Bureau of Fire Protection

  - Department of Public Health

  - Water and Power Resources

Steel Structures Painting Council (SSPC)

- Steel Structures Painting Manual, Volume 2, Systems and Specifications

- Metal surfaces for coating systems would be prepared following the specifications and standard practices of the SSPC and the specific instructions of the coatings manufacturer.

Underwriters Laboratory (UL)

- UL-555-1990--Fire Dampers

- UL-1025-1991--Electric Air Heaters

- UL-1042-1987--Electric Baseboard Heating Equipment

- UL-1046-1986--Electric Central Air Heating Equipment

- National Board Rules for Boiler Blow-off Tanks

Civil/Architectural

- Other recognized standards would be used where required to serve as guidelines for design, fabrication, and construction. When no other code or standard governs, the California Building Code, 1998 Edition as amended by the Los Angeles County Code, would govern.

International Conference of Building Officials

- California Building Code
- Seismic standards and criteria would follow the California Building Code
- Uniform Building Code, 1997 is mentioned but specifics of Chapter 708 are not. Chapter 708 includes the following:
  - 7006 (Grading Plans)
  - 7009 (Cuts)
  - 7012 (Terraces)
  - 7013 (Erosion Control)
  - 7015 (Final Report)
  - Figure 16-1 (Minimum Basic Wind Speeds)
  - Table 16-H, Method 1 (Wind Velocity Pressure Coefficients)
  - Figure 16-2 (Seismic Zone Map)
  - Appendix 15, Figure A-16-1 (Ground Snow Loads)
  - Section 1909 (Load Factors and Load Combinations Reinforced Concrete)
  - Section 1612 (Load Factors and Load Combinations Steel Structures)
- Standard Plumbing Code, 1997
- ASCE 7-95
- ACI 318-95/318R-95, Building Code Requirements for Structural Concrete and Commentary
- CRSI Manual of Standard Practice

- AISC Specification for Structural Steel Buildings, Allowable Stress and Plastic Design, 1989
- AWS Dl.1, American Welding Society Structural Welding Code for Steel
- ASTM, American Society for Testing and Materials Standards (as applicable)
- AASHTO-HS-20-44 (Truck Support Structures)
- Occupational Safety and Health Standard (OSHA):
- Walking and Working Surfaces, Subpart D
- Lighting
- ANSI/ASME STS-1-1992 (Steel Stacks)
- ASTM A 615, ASTM a 36, ASTM A 572, ASTM A 325, ASTM A 490, ASTM A 307, and ASTM A 185 (Steel Grades)
- ASTM C270, ASTM C129, and ASTM C 476 (Concrete Grades)
- NFPA 101, National Fire Protection Association, Life Safety Code
- NFPA 850, National Fire Protection Association, Recommended Practice of Fire Protection for Electric Generating Plants

Electrical

- Specifications for materials would follow the standard specifications of the American Society for Testing and Materials (ASTM), the Institute of Electrical and Electronics Engineers (IEEE), and the American National Standards Institute (ANSI), unless noted otherwise.
  - ANSI C2-1993--National Electrical Safety Code
  - ANSI C37.06-1987 (R1994)--Standard - AC High-Voltage Circuit Breakers Rated on a Symmetrical Current Basis, Preferred Ratings and Related Required Capabilities
  - ANSI C37.010-1979 (R1989)--Application Guide for AC High-Voltage Circuit Breakers Rated on a Symmetrical Current Basis
  - ANSI C50.41-1982--Polyphase Induction Motors for Power Generating Stations

- ANSI C57.12.51-1981 (R1989)--Requirements for Ventilated Dry-Type Power Transformers 501 kVA and Larger, Three-Phase with High-Voltage 601 to 34,500 Volts, Low Voltage 208Y/120 to 480 Volts

- ANSI C57.19.00-1991--General Requirements and Test Procedure for Outdoor Power Apparatus Bushing

- ANSI/IEEE 422-1986--Guide for the Design and Installation of Cable Systems in Power Generating Substations

- ANSI/IEEE 525-1993--Design and Installation of Cable Systems in Substations

- ANSI/IES RP7-1990--Practice for Industrial Lighting

- ANSI/IEEE C37.13-1990--Low Voltage AC Power Circuit Breakers Used in Enclosures

- ANSI/IEEE C37.20.1-1993--Metal-Enclosed Low-Voltage Power Circuit Breaker Switchgear

- ANSI/IEEE C37.20.2-1994--Metal-Clad and Station-Type Cubicle Switchgear

- ANSI/IEEE C37.21-1985 (R1992)--Control Switchboards

- ANSI/IEEE C57.12.00-1993--General Requirements for Liquid-Immersed Distribution, Power, and Regulating Transformers

- ANSI/IEEE C57.13-1978 (R1987)--Requirements for Instrument Transformers

- ANSI/IEEE C57.1 15-1992--Guide for Loading Mineral-Oil Immersed Power Transformers Rated in Excess of 100 milivolt amperes (mVA)

- ANSI/IEEE 80-1986 (R1991)--Safety in AC Substation Grounding

- ANSI/IEEE 141-1993--Recommended Practice for Electric Power Distribution for Industrial Plants

- ANSI/IEEE 142-1991--Grounding of Industrial and Commercial Power Systems

- ANSI/IEEE 242-1986 (R1991)--Recommended Practice for Protection and Coordination of Industrial and Commercial Power Systems

- ANSI/IEEE 399-1990--Recommended Practice for Power Systems Analysis
- IEEE 485-1983--Recommended Practice for Sizing Large Lead Storage Batteries for Generating Stations and Substations
- ANSI/IEEE 1119-1988 (R1993)--Guide for Fence Safety Clearances in Electric-Supply Stations
- NEMA MG1-1993--Motors and Generators
- NEMA MG2-1989--Safety Standard for Construction and Guide for Selection, Installation, and Use of Electric Motors and Generators
- NEMA SG3-1990--Low-Voltage Power Circuit Breakers
- NEMA SG4-1990--Alternating Current High-Voltage Circuit Breakers
- ANSI/NEMA 250-1991--Enclosures for Electrical Equipment
- ANSI/NFPA 70-1993--National Electrical Code
- NEMA PE1-1992--Uninterruptible Power System
- ASTM E 84--Insulation Flame Spread
- NFPA/ANSI Cl, Article 500--Initiation Criteria
- ANSI 2, Article 127--Generator Station Hazardous Area Criteria for Electrical Protection
- NEC Article 500, Standard 497M--Classification of Hazardous Elements
- NEC Articles 501 and SO2--Standards for Construction of Electrical Equipment in Hazardous Areas
- ANSI/IES RP-7-1979--Industrial Lighting
- ANSI/IES RP-8-1 979--Roadway Lighting

I&C Standards

- American Society of Mechanical Engineers (ASME):
  - PTC 19.3, Temperature Measurement
  - PTC 19.5, Flow Measurement

- Fluid Meters, 6th Edition
- B31.1, Power Piping

* American National Standards Institute (ANSI):
  - ANSI/FCI 70-2, Control Valve Seat Leakage Classifications
  - B 16.5, Pipe Flanges and Flanged Fillings
  - B 16.34, Valves - Flanged and Butt-Welding End
* Electronic Industries Association (EIA):
  - RS-232C, Interface Between Data Terminal Equipment and Data Communications Equipment
* Institute of Electrical and Electronics Engineers (IEEE):
  - 518, Guide for the Installation of Electrical Equipment to Minimize Electrical Noise Inputs to Controllers from External Sources
  - 142, ANSI/IEEE Recommended Practice for Grounding of Industrial and Commercial Power Systems
  - 802.4, Ethernet
  - 472, Surge Withstand Capability
  - 998, Lighting Protection Systems
* Instrument Society of America (ISA):
  - MC 96.1, Temperature Measurement Thermocouples
  - RP 3.2, Flange-Mounted, Sharp Edge Orifice Plates for Flow Measurements
  - S5.1, Instrumentation Symbols and Identification
  - S5.2, Binary Logic Diagrams for Process Operations
  - S5.4, Instrument Loop Diagrams
  - S5, Graphic Symbols for Process Displays
  - S50.1, Compatibility of Electronic Signals For Industrial Process Instruments

- SSI.1, Process Instrumentation Terminology
- ANSI/ISA S75.01, Control Valve Sizing Equations
- ANSI/ISA S75.02, Control Valve Capacity Procedure
- 70, National Electric Code

- National Electrical Manufacturers Association (NEMA):
  - 4, Class Enclosure
  - ICS 1, General Standards for Industrial Controls and Systems
  - 250, Enclosures for Electrical Equipment (1,000 Volts Maximum)
- Scientific Apparatus Makers Association (SAMA):
  - PMC 20.1, Process Measurement and Control Terminology, PMC 22.1, Functional Diagramming of Instrument and Control Systems

Gas Turbine Generator Codes and Standards

- The following are codes and standards for gas turbine generators. This list is typical for gas turbine-generator design; additional codes and standards may be used, depending on the final plant design and equipment selection.
  - ANSI/ASME 7-1995--Minimum Design Loads for Buildings and Other Structures
  - ANSI/ASME Bi.1-1989--Unified Inch Screw Threads
  - ANSI/ASME Bi.20.1-1983--General Purpose (Inch) Pipe Threads
  - ANSI/ASME B16.21 -1992--Nonmetallic Flat Gaskets for Pipe Flanges
  - ANSI/IEEE C37.90.1-1989--Surge Withstand Capability Tests for Protective Relays and Relay Systems
  - ANSI/IEEE C37.101-1993--Guide for Generator Ground Protection as Applicable to High Impedance Grounding
  - ANSI/IEEE C57-1995--Compilation of all C57 Transformer Standards
  - ANSI C50.10-1990--Rotating Electrical Machinery - Synchronous Machines

- ANSI C50.13-1989--Rotating Electrical Machinery - Cylindrical Rotor Synchronous Generators
- ANSI C50.14-1977--Requirements for Combustion Gas Turbine-Driven Cylindrical Rotor Synchronous Generators
- ANSI/IEEE 100-1996--Dictionary of Electrical and Electronics Terms
- NEMA TRI-1993--Transformers, Regulators, and Reactors
- NFPA 497A-1992--Classification of Class I Hazardous (Classified Locations for Electrical Installations in Chemical Process Areas)
- NFPA 8506-1995--Standard on Heat Recovery Steam Generator Systems
- ANSI S1.4-1983--Specification for Sound Level Meters
- ANSI S1.13-1995--Methods for the Measurement of Sound Pressure Levels
- ANSI/SAE/J 184-Feb. 1987--Qualifying a Sound Data Acquisition System
- ANSI/ASME B31.3-1996--Chemical Plant and Petroleum Refinery Piping Gas Turbine Piping Systems
- ANSI/ASME PTC-36-1985--Measurement of Industrial Sound
- ANSI B133.2-1997--Basic Gas Turbine
- ANSI B133.3-1981--Gas Turbine-Procurements Standard Auxiliary Equipment
- ANSI B133.4-1978--Gas Turbine Control and Protection Systems
- ANSI B133.5-1978--Gas Turbine Electrical Equipment
- ANSI B133.8-1977--Gas Turbine Installation Sound Emissions
- ANSI/IEEE C37-1995--Guides and Standards for Circuit Breakers, Switchgear, Substations, and Fuses
- ANSI/IEEE C37.1-1994--Definition, Specification, and Analysis of Systems
- ANSI/IEEE C37.2-1996--Electrical Power Systems Device Function Numbers

- AGMA 6011-H97--Specifications for High-Speed Helical Gear Units
- ANSI/IEEE 421.1-1996--Definitions for Excitation Systems for Synchronous Machines
- EIAITIA RS-232E-1991--Interface Between Data Terminal Equipment and Data Circuit Terminating Equipment Employing Serial Binary Interchange
- ANSI/ASME 846.1-1995--Surface Texture
- ANSI Y14.SM-1994--Dimensioning and Tolerancing
- ANSI Y14.15-1996--Electrical and Electronics Diagrams (On-Bas Gas Turbine and Accessory Bas Equipment)
- ANSI Y14.17-1966--Fluid Power Diagrams
- ANSI Y14.36-1978--Surface Texture Symbols
- ANSI/IEEE 315-1975--Graphic Symbols for Electrical and Electronics Diagrams
- ANSI Y32.10-1967--Graphic Symbols for Fluid Power Diagrams
- ANSI Y32.11-1961--Graphic Symbols for Process Flow Diagrams in the Petroleum and Chemical Industries
- ANSI/ASME Y32.2.3-1949--Graphic Symbols for Pipe Fillings, Valves, and Piping
- ANSI/AWS A2.4-1998--Symbols for Welding, Brazing, and Nondestructive Examination
- ISO 7919-1-1986--Mechanical Vibrations - Measurements on Rotating Shafts and Evaluation
- ISO 10816 (Draft)--Mechanical Vibrations - Evaluation of Machine Vibration by Measurements of Nonrotating Parts
- TEMA C, 7th Edition--Mechanical Standards for Class C Heat Exchangers Crane Lifts; Factor of Safety
- OSHA Regulations--Crane Lifts; Factor of Safety, No. 1910-179-1995

2.5.4 References

U. S. Bureau of Reclamation, 2001. Delta-Mendota Canal Monitoring Program, 1992-1997. Bruce Moore, USBR.

TABLES

Table 2-1
Estimated Average Daily Water Requirements (gpm*)

Water Use	Delta-Mendota Canal
Reverse Osmosis (RO) Service Water	19
Demineralized Water	0[1]
Plant Service Water	1
Total	20

gpm = gallons per minute

[1] Demineralized water demand is intermittent. This water flow would be intermittent and at a very low flow rate in order to refill the CTG water wash tank following each wash cycle.

Table 2-2
Estimated Maximum[1] Water Requirements (gpm*)

Water Use	Delta-Mendota Canal
RO Service Water	51
Demineralized Water	0[2]
Plant Service Water	1
Total	52

gpm = gallons per minute

[1] Maximum water requirements are based on 98 ºF ambient temperature.

[2] Demineralized water demand is intermittent. This water flow would be intermittent and at a very low flow rate in order to refill the CTG water wash tank following each wash cycle.

Table 2-3
Project Schedule Major Milestones

Activity	Date
Begin Construction	December 2001
Initiate Startup	April 2002
Mechanical Completion	June 2002
Begin Commercial Operation[1]	July 2002
Complete Construction	September 2002

[1] Additional punch list completion and project closeout activities will occur for approximately three months following commencement of commercial operation.

Table 2-4
Total Daily Construction-Related Vehicle Generation*

		Daily Average Trip Generation		***Peak Period Trip Generation***	
Origin/Destination of Worker Trips	**Trip Distribution**	**Peak Hour (One-way) Trips**	**Total Daily (Two-way) Trips**	**Peak Hour (One-way) Trips**	**Total Daily (Two-way) Trips**
West of TPP Site via I-580	50%	51	102	80	160
North and East of TPP Site via I-205/I-5	25%	25.5	51	40	80
South and East of TPP Site via I-580/ I-5/SR-132	25%	25.5	51	40	80
Total	**100%**	**102**	**204**	**160**	**320**

* This analysis assumes: 80% of workforce would drive alone, making 2 one-way trips/worker/day (a two-way round trip between home and project site); and 20% of workforce would carpool with each other (2 workers/vehicle), with each carpool duo making 2 one-way trips/*every 2 workers*/day (a two-way round trip between home and project site).

Table 2-5
Major Equipment Redundancy

Description	Number	Note
Simple-Cycle CTG	Two trains	No redundancy
Blowers for Air Dilution	One per train, 100 percent capacity	No redundancy
SCR and CO Catalyst	One module per train, 100 percent capacity	No redundancy
Compressed Air System	Two, 100 percent capacity	100 percent redundancy
Generator Breaker	Two trains	No redundancy
CT Auxiliary Load Supply Transformers	Two trains	100 percent redundancy
Cranking Motor Supply Transformers	Two trains	No redundancy
Unit Auxiliary Transformers	Two, 100 percent capacity	100 percent redundancy

Table 2-6
LORS Related to Facility Design

LORS	Applicability	Conformance (Section)
	Need for Facility Demand Conformance	
		Section 2.5, Project Objectives
	Federal	
	None applicable	
	State	
	None applicable	
	Local	
	None applicable	
	Project Siting and Construction	
	Federal	
Uniform Building Code	Incorporated in and superseded by the CBC, 1998.	Section 2.3.1
	State	
PRC 2690–2699.6 and 25523(a); 14 CCR § 3270–3725; 20 CCR § 1752(b) & (c)	Protect environment quality and assure public health.	Section 2.2.10
State Fire Marshall	Boiler and Pressure Vessel Code Inspection.	Appendices J1–J6
	Local	
1997 Uniform Building Code containing the 1998 California Amendments; Title 24, Part 2, CCR		Appendices J1–J6
1997 Uniform Mechanical Code containing the 1998 California Amendments; Title 24, Part 4, CCR		Appendices J1–J6
1997 Uniform Plumbing Code containing the 1998 California Amendments; Title 24, Part 5, CCR		Appendices J1–J6
1996 National Electrical Code containing the 1998 California Amendments; Title 24, Part 3, CCR		Appendices J1–J6
CCR, Titles 19, 24, and 25	Applicable to work authorized by local jurisdiction via the permit process.	
1997 Uniform Fire Code	Applicable to work authorized by local jurisdiction via the permit process.	

Table 2-6 (continued)
LORS Related to Facility Design

LORS	Applicability	Conformance (Section)
	Industry	
Foundations and Civil Engineering Design Criteria	Meet design criteria.	Appendix J1
Structural and Seismic Engineering Design Criteria	Meet design criteria.	Appendix J2
Mechanical Engineering Design Criteria	Meet design criteria.	Appendix J3
Control Systems Engineering Design Criteria	Meet design criteria.	Appendix J4
Electrical Engineering Design Criteria	Meet design criteria.	Appendix J5
	Project Design and Operation	
	Federal	
Occupational Health & Safety Act of 1970, 29 USC 651 et seq.; 29 CFR 1910 et seq.; and 29 CFR 1926 et seq.	Meet employee health and safety standards for employer-employee communications, electrical operations, and chemical exposures.	Section 2.3.2.3
Department of Labor, Safety and Health Regulations for Construction Promulgated Under Section 333 of the Contract Work Hours and Safety Standards Act, 40 USC 327 et seq.	Meet employee health and safety standards for construction activities. Requirements addressed by CCR Title 8, General Construction Safety Orders.	Section 2.3.2.3
Uniform Fire Code, Articles 80, 79, 4	Meet requirements for the storage and handling of hazardous materials, flammable and combustible liquids, and for obtaining permits.	Section 2.2.8.3
National Fire Protection Association (Refer to NFPA Table 7.4-1 for list of standards)	Meet standards necessary to establish a reasonable level of safety and property protection from the hazards created by fire and explosion.	Sections 2.2.11 and 2.3.2.2
14 CFR, Part 77, Objects Affecting Navigable Airspace	Completion of Notice of Proposed Construction or Alteration, FAA Form 7460-1H.	Section 2.2.1
Advisory Circular No. 70/7460, Obstruction Marking and Lighting	Meet FAA standards for marking and lighting of obstructions as identified by FAR Part 77.	Section 2.2.1
Advisory Circular 70/7460-2I, Proposed Construction or Alteration of Objects That May Affect the Navigable Airspace	Notify FAA prior to construction, as appropriate.	Section 2.2.1

Table 2-6 (continued)
LORS Related to Facility Design

LORS	Applicability	Conformance (Section)
14 CFR, Part 91, Air Traffic and General Operating and Flight Rules	Comply with restrictions governing the operation of aircraft, including helicopters.	Section 2.2.1
49 USC § 1348, Subdivision (a)	Comply with Secretary of Transportation policy regarding safety of aircraft and utilization of airspace.	Section 2.2.1
47 CFR § 15.25, Operating Requirements, Incidental Radiation	Mitigation for any device that causes communications interference.	Section 2.2.5.1
Title 49 CFR, Part 192, Transportation of Natural and Other Gas by Pipeline	Construction must conform to Department of Transportation standards.	Section 2.2.6
	State	
CCR, Title 8	Meet requirements for a safe and hazard-free working environment. Categories of requirements include General Industry Safety Orders, General Construction Safety Orders, Electrical Safety Orders.	Section 2.3
California Clean Air Act, California Health & Safety Code, § 39650 et seq.	Meet requirements for Best Available Control Technology.	
PRC § 25523(a); 20 CCR §1752, 1752.5, 2300–2309 and Division 2, Chapter 5, Article 1, Appendix B, Part (i), CEC		Section 2.2.10
California Health & Safety Code, Part 6, § 44300 et seq.	Estimate emissions for listed air toxic pollutants and submit inventory to air district for major sources of criteria air pollutants. Followup from air district may require a health risk assessment.	Section 2.2.10
California Health and Safety Code §§ 25500–25541; 19 CCR §§ 2720–2734		Section 2.2.10
20 CCR, Appendix B, Subdiv. (a), (d) (g) and Subdiv. (a), (h), §§ 1741–1744 and § 1752, Information Requirements for a Nongeothermal Application	Compliance with applicable laws for safety and reliability.	Each appropriate environmental section; for instance, Section 8.2 for Biological Resources
PRC, § 25000 et seq., Warren-Alquist Act, § 25520 Subdivision (g)	Provide description of transmission line including the right-of-way.	Section 2.1

Table 2-6 (continued)
LORS Related to Facility Design

LORS	Applicability	Conformance (Section)
General Order 52 (GO-52) CPUC, Construction and Operation of Power and Communication Lines	Prevent or mitigate inductive interference.	Appendices J1–J6
General Order 95 (GO-95) CPUC, Rules for Overhead Electric Line Construction	Design and construct line in compliance with GO-95.	Appendices J1–J6
Radio & Television Interference (RI/TVI) Criteria	RI/TVI mitigation requirements if applicable.	Appendices J1–J6
Local		
CCR, Titles 19, 24, and 25, and 1997 Uniform Fire Code, as amended by the State of California	Contain laws applicable to work authorized by local jurisdiction via the permit process.	
California Building Code, Seismic Zone 4		Section 8.15.2.2
	Industry	
EPRI, NERC, various codes and standards for components	EPRI and NERC trade associations guidelines would be followed.	Appendices J1–J6
Various	Industry codes and trade association standards are typically requirements of equipment manufacturers.	Appendices J1–J6
ANSI/AWWA C151/A21.5	Construction must conform to standards and related specifications.	Appendix J

Notes:
ANSI = American National Standards Institute
AWWA = American Water Works Association
CBC = California Building Code
CCR = California Code of Regulations
CEC = California Energy Commission
CFR = Code of Federal Regulations
EPRI = Electric Power Research Institute
FAA = Federal Aviation Administration
FAR = Federal Aviation Regulations
NERC = National Energy Regulatory Commission
OSHA = Occupational Safety and Health Administration
PRC = California Public Resources
UBC = Uniform Building Code
USC = United States Code

FIGURES